Yuba Basin Modeling Forum

Wednesday, January 19, 2005.

Welcome and Introductions:

On January 19, 2005, a meeting of the Yuba Basin Modeling Forum was convened in Sacramento. John Clerici, Public Affairs Management, provided meeting facilitation. The desired outcomes of the meeting included:

- Receive presentations on selected models in the Yuba River Basin
- Discuss the overall YBMF Conceptual Model Framework
- Identify dates and discussion topics for next Forum meetings

Update on the Upper Yuba River Studies Program

David Christophel, CH2M HILL, provided the group with an update on the progress of the Upper Yuba River Studies Program (UYRSP). Many Forum participants are involved in the UYRSP and have given presentations on their specific studies to the Forum previously. David focused his presentation on the initial findings of the habitat studies, but he began with a background explanation of the project, which is a stakeholder-driven process that was initiated in 1998 through a grant from CBDA. He reviewed the purpose statement and study elements of the Program--habitat, sediment, water quality, water supply/hydropower, flood risk, and socio-economics. David explained that there are teams of technical experts studying the existing conditions of these study elements. As the Program moves forward, the teams will begin to analyze the potential impacts of various dam modification scenarios upon these resources. David explained how the Work Group will navigate through certain questions to arrive at a recommendation regarding fish passage at Englebright Dam. If the Work Group determines that there is sufficient habitat to justify a passage project and that one or more passage options are feasible, then the Work Group would recommend to CBDA that the study move forward by analyzing those options and their impacts. If the Work Group were to determine that there was enough habitat but that there are no feasible passage options, they would not recommend further analysis but provide additional guidance (if desired) to CBDA to finish existing studies and recommend potential future activities in the watershed. The Work Group would take the same action if they were to find that there is not sufficient habitat to justify a project.

Regarding the habitat studies, David explained that Dave Vogel has been responsible for collecting information regarding adult fish barriers and holding habitat. As part of his research, Dave compared information on the leaping abilities of steelhead trout and Chinook salmon to the height of numerous barriers he recorded on aerial digital video and verified in the field. He also examined characteristics of plunge pools associated with potential barriers. With the obvious exclusion of Our House Dam on the lower Middle Yuba River, Dave found that the only impassable barriers (not passable even at high flows) were in the upper reaches of the watershed. To determine suitable holding habitat, Dave looked at pool depth and size, cover (over-hanging vegetation, boulders, and ledges), and the size of the pool's associated bubble curtain. He found that there appear to be more holding pools in the Middle Yuba. Water temperature is also a contributing factor in determining holding and habitat suitability. Temperature recorders that have been in the rivers since 2003 reveal that on the Middle Yuba, temperatures are coolest at Milton Dam and warmest at the confluence with the North Yuba River. Temperatures in the South Yuba follow a similar pattern and are approximately 10 degrees higher than in the Middle Yuba. Thus for summer holding under current flow conditions, the Middle Yuba

provides a longer, cooler stretch of river water than the South Yuba River. A water temperature model and hydraulic model are currently under development to further assess habitat availability. Current trout distribution data is also being used as part of the assessment.

David moved on to discuss the spawning habitat studies being lead by Carl Mesick. Carl field surveyed 101 potential spawning sites on the Middle and South Yuba rivers. For his studies, he used Wolman Pebble Counts and measured streambed permeability, the depths of holding habitats, the extent of overhead cover, the area and depth of gravel, and water depth and velocity. He found over 415 potential spawning sites, 391 of which could provide Chinook refuge habitat (high flows provide refuge for steelhead at all sites). Carl also found that the gravel beds are generally small (mean 850 square-feet) and highly permeable with a median gravel size of 1.7 inches. Human effects through coble weir construction and suction dredging have had a generally positive effect on permeability. Carl plotted the cumulative number of redds per river mile and found that the Middle Yuba has the potential for a greater number of redds than the South Yuba. It was noted that this is influenced by accessibility and water temperature.

CH2M HILL led the effort to examine rearing habitat. The available data used for the studies included topographic maps, aerial photos, digital videography, historical field investigations, and ground verification. The team assessed off-channel habitat, riparian vegetation and shade, substrate, and cover as important factors contributing to rearing habitat. Field verification revealed that similarities between rearing habitat on the Middle and South Yuba rivers are greatest for macrohabitat features (habitat type, vegetation) and lowest for microhabitat features (substrate, cover).

Preliminary conclusions from the habitat studies *under current conditions* include:

- Physical habitat characteristics are generally adequate to support salmonids in the Middle and South Yuba rivers
- Upstream adult passage is blocked on Middle Yuba at Our House Dam
- Surveyed tributaries do not appear to support spawning habitat for large salmonids
- Suitability of accessible habitat in the upper river is likely limited by elevated water temperature under current conditions

David concluded his presentation by explaining the next steps in answering the biological feasibility question. The habitat team will review water temperature data and modeling efforts, data from a summer 2003 trout distribution survey, and an assessment of "population viability." They will consider potential habitat under future conditions, which could include an increased release flow which would likely result in lower river water temperatures.

David Christophel and John Clerici stressed that initial findings will be reviewed internally by the Work Group, who will then make the recommendation to proceed or not public in Spring 2005. They also commented that at this point, the Work Group will be reviewing general findings regarding habitat before going into the specifics of dam removal scenarios and their impacts on socio-economics, etc. David informed Cesar Blanco that the socio-economics group is using IMPLANT to determine the regional benefits of upstream fisheries; they will be considering the passive benefits, as well.

Mark Guard recommended that the team review his data concerning spawning and rearing in the Lower Yuba River recently published by US Fish and Wildlife.

The group discussed reasons why temperatures in the South Yuba were 10 degrees higher than in the Middle Yuba. It was suggested that Spaulding Reservoir was an influencing factor.

The group discussed historical accounts of fish distribution before the dam. David stated that there did not appear to be much empirical data available, except for a report by the Army Corps of Engineers from the 1930s. Mark Guard asked if that report could be made available to the Forum. Ted Frink asked if anyone had information on the Yuba River Basin before the 1954 floods. Julie Tupper recommended contacting Hank Neels, a historical resources consultant who works out of the Nevada County Historical Library in Nevada City.

Janice Pinero asked about the environmental review process for the UYRSP. David explained that the team is now developing a Feasibility Report to submit to CBDA with a recommendation to proceed or not. If CBDA decides that there is a viable project, then the environmental review process will begin. Julie Tupper noted that the Army Corps of Engineers and the Federal Energy Regulatory Commission will likely want to provide input.

Yuba River Instream Flow Studies

Mark Gard gave a presentation on his work regarding instream flow studies between Englebright Dam and the Lower Yuba's confluence with the Feather River. The purpose of the studies is to determine the suitability of habitat for the spawning and rearing (fry, juvenile) of fall and spring-run Chinook salmon and steelhead/rainbow trout. They are researching flow habitat relationships to determine what the ideal flow regime could be so that hydropower generation does not adversely effect fish reproduction. Mark's team is using the River2D model (two dimensional) for hydraulic and habitat simulation. Habitat suitability criteria used for spawning includes depth, velocity, and substrate. Data is collected in shallow areas by wading, and in deep areas using ADCP and an underwater video system. Mark explained that ADCP involves using Doppler radar while crossing the river on boat to collect a variety of data including depth and topography. This method of data retrieval is very effective and timely. For fry and juvenile rearing, the team is examining depth, velocity, cover, and adjacent velocity. Data is collected near the banks by snorkeling, while SCUBA and ADCP is used to survey away from banks. Mark showed several photographs of the surveying equipment and techniques. Total stations are used to collect topographical data in shallow and dry portions of the sites. Velocities are collected within the site to validate the model. By using these techniques, ten spawning sites and eight rearing sites have been identified. Mark displayed numerous images of the river channel. He explained they also conducted habitat mapping in bar complexes, flat water, and side channels, which are comprised of riffles, runs, glides, and pools.

Mark described the steps of the hydraulic modeling:

- Refine bed topography
- Develop computational mesh
- Conduct hydraulic simulation
- Validate velocity predictions

Examples of the following were provided:

- A colored 2D projection of the study site's bed topography
- A triangular irregular network grid used for hydraulic calculations
- A histogram showing velocity validation

Regarding spawning, Stefan Lorenzato asked if Mark found a relationship between substrate and velocity. Mark responded that those two aspects are being considered independently. The group discussed how Mark's research could be folded into the work being conducted by ENTRIX at Daguerre Point Dam and could benefit Bob Mussetter's flood management research on the UYRSP.

Ted Frink asked at what point one gains the most habitat for spawning versus rearing. Mark explained that it can become a balancing act, but if rearing habitat is limiting, then there would not be a need for spawning habitat. There may also be trade-off benefits for spawning and rearing of different fish species in the river—steelhead/rainbow trout and fall/spring-run Chinook salmon. Mark stated that no limiting factors have been developed yet. Ted commented that NOAA and other agencies suspect that spawning habitat is limiting.

Mark informed Forum participants that examining the influence of temperature will be the next step of his research. John Clerici noted that there is a temperature regulator at Bullard's Bar. Julie Tupper briefly explained how water is moved around in the Yuba system, and commented that temperature is a critical factor in determining habitat suitability for salmonids at any life stage. Mark stated that high water temperature is a definite concern on the Lower Yuba, particularly near Daguerre Dam. It was speculated that predatory issues could also be of concern.

Mark informed the group that he anticipates all reports to be completed by 2007, which is also the date when many dams will be up for FERC re-licensing.

YBMF Conceptual Model Framework

Aric Lester presented the group with a revised conceptual model framework for the Yuba Basin Modeling Forum. Aric encouraged Forum participants to review the Framework which is currently on the Forum's Web site at: www.watershedrestoration.water.ca.gov/ybmforum, where one can download and print the various pages of the Framework. In addition to the four main categories outlined in previous meetings (Physical, Chemical, Biological, and Social), the model will contain other subcategories based on Forum presentations. It was explained that the purpose of the framework is to provide an easy way to categorize links between various studies or models, and access information.

Instead of trying to store actual data directly onto the Web site, Forum participants suggested having a hyperlinks page, where one could then connect to the Web site of the researchers who are conducting the studies. Bob Mussetter commented that a "hydrologic model" box could be added to the page highlighting his research, which could explain how the model works. Cesar Blanco suggested that technical escapement information from the USFWS Web site could be useful on this Web site and offered to have his IT person contact Aric. Hamish Moir commented that the research he is conducting with UC Davis could be part of the hydrology, sediment, and habitat pages. Mark and Janice discussed the flow fluctuation, flow dependent, redd dewatering and isolation studies being coordinated between USFWS and Jones and Stokes. Janice suggested adding a "regulatory" box to each study page that would explain the environmental documentation required (or not).

The group was tasked with individually reviewing the pages of the Web site and providing input to Aric Lester (alester@water.ca.gov) and Public Affairs Management (s.hedeline@pamsf.com). Forum participants were asked to provide comments on content, data formats, site navigation, and links.

Next Meeting and Discussion Items:

- Next Meeting Date and Time: February 23, 1-4 pm.
- Location: 2800 Cottage Way, Sacramento, cafeteria conference room C-1001
- Tentative Presentations:
  - Dave Thomas on identifying Yuba Fishery and Restoration Opportunities
  - Chris Bowles on the Yuba Goldfields and Parkway Concept

It was suggested to coordinate with Mike Tucker of the Lower Yuba Technical Group so the Forum could follow the next Lower Yuba Technical Group meeting, scheduled for either April 12 or 14.

Meeting Participants

Hamish Moir	UC Davis
Paul Wisheropp	ENTRIX, Inc.
Julie Tupper	USDS—Forest Service
Aric Lester	Department of Water Resources
Ted Frink	Department of Water Resources
Stefan Lorenzato	Department of Water Resources
Cesar Blanco	US Fish and Wildlife Service
Mark Gard	US Fish and Wildlife Service
David Christophel	CH2M HILL
Mary Keller	Sutter County
Randall Jarvis	Yuba Outdoors Adventures
Janice Pinero	Surface Water Resources, Inc
Bob Mussetter	Mussetter Engineering, Inc.
Jeff Opperman	SYRCL
Sonja Wadman	Public Affairs Management
John Clerici	Public Affairs Management